Pengaruh penambahan kitosan larut air berbagai konsentrasi pada MTA terhadap kemampuan antibiofilm enterococcus faecalis = Effect of water-soluble chitosan addition in various concentrations to MTA on the antibiofilm ability against enterococcus faecalis

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Abstrak

Latar belakang: E. faecalis merupakan bakteri yang mendominasi lesi periapikal persisten dengan prevalensi 22-77%. Beberapa penelitian menunjukkan MTA tidak memiliki aktivitas antibakteri terhadap E. faecalis, yang diketahui memiliki kemampuan untuk membentuk biofilm, menginvasi tubuli dentin, mempertahankan viabilitas dalam kondisi tanpa nutrisi dan pH basa yang esktrim. Kitosan telah terbukti efektif melawan beberapa mikroorganisme rongga mulut, salah satunya E. faecalis. Kitosan larut air merupakan turunan kitosan yang menunjukkan aktivitas antibakteri pada pH yang lebih luas. Tujuan: Penelitian ini akan menganalisis pengaruh penambahan kitosan larut air 5% dan 10% pada MTA terhadap kemampuan antibiofilm E. faecalis.
Metode: Tiga kelompok penelitian, yaitu MTA, MTA dengan penambahan kitosan larut air 5%, dan MTA dengan penambahan kitosan larut air 10%, dibuat menjadi ekstrak dan dipaparkan pada biofilm E. faecalis. Kemampuan antibiofilm ditentukan melalui nilai viabilitas biofilm E. faecalis yang didapatkan dari nilai densitas optik uji MTT assay.
Hasil: Terdapat perbedaan bermakna (p<0,05) nilai viabilitas biofilm E. faecalis antara kelompok semua kelompok. Kelompok MTA dengan penambahan kitosan larut air 10% memiliki nilai viabilitas biofilm E. faecalis yang paling rendah, diikuti oleh MTA dengan penambahan kitosan larut air 5%, dan MTA.
Kesimpulan: Penambahan kitosan larut air berbagai konsentrasi pada MTA meningkatkan kemampuan antibiofilm terhadap E. faecalis. MTA dengan penambahan kitosan larut air 10% menghasilkan kemampuan antibiofilm tertinggi terhadap E. faecalis secara signifikan dibandingkan dengan MTA dan MTA dengan penambahan kitosan larut air 5%.
Background: E. faecalis is the dominant bacteria in persistent periapical lesions with a prevalence of 22-77%. Several studies have shown that MTA has no antibacterial activity against E. faecalis, which is known to have the ability to form biofilms, invade dentinal tubules, maintain viability in conditions of no nutrition and extreme alkaline pH. Chitosan has been shown to be effective against several oral microorganisms, one of which is E. faecalis. Water-soluble chitosan is a chitosan derivative that shows antibacterial activity at a wider pH.
Objective: This study will analyze the effect of adding 5% and 10% water-soluble chitosan to MTA on the antibiofilm ability against E. faecalis. Methods: Three research groups, namely MTA, MTA with the addition of 5% water-soluble chitosan, and MTA with the addition of 10% water-soluble chitosan, were made into extracts and exposed to E. faecalis biofilms. Antibiofilm ability was determined by the value of the E. faecalis biofilm viability obtained from the optical density value of the MTT assay test. Results: There was a significant difference (p<0.05) in the value of E. faecalis biofilm viability between all groups. The MTA with the addition of 10% water-soluble chitosan group had the lowest biofilm viability value of E. faecalis, followed by MTA with the addition of 5% water soluble chitosan, and MTA.

Conclusion: The addition of water-soluble chitosan in various concentrations to MTA increased the antibiofilm ability against E. faecalis. MTA with the addition of 10% water soluble chitosan produced the highest antibiofilm ability against E. faecalis significantly compared to MTA and MTA with the addition of 5% water-soluble chitosan.